Hypoxia During One Lung Ventilation Simulation

INDIANA UNIVERSITY
SCHOOL OF MEDICINE

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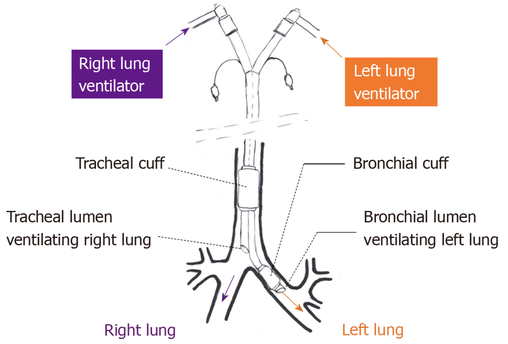
INTRODUCTION

- Lung Isolation techniques are designed to allow for one lung ventilation and subsequent surgical access to the thorax and adjacent structures, such as for lung resection, mediastinal, cardiac, vascular, esophageal, or even spinal surgery.
- There are several options to facilitate selective ventilation of one lung. Most notably, these include double lumen tubes (DLTs) and bronchial blockers placed through a single-lumen endotracheal tube (SLT).
- In this simulation, a patient becomes hypoxic intraoperatively and residents must react accordingly. They must recognize, manage, and treat the patient who is deteriorating as a result of intraoperative hypoxia during one lung ventilation.
- All physician anesthesiologists need to be able to quickly evaluate and treat intraoperative hypoxia.
- This simulation demonstrates the presentation of intraoperative hypoxia during OLV. We therefore targeted CA2 (postgraduate year 3) who are on subspecialty rotations and likely to be doing clinical cases with OLV during this training year

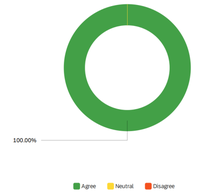


SIMULATION SCENARIO

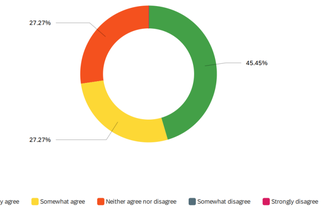
- Case begins preoperatively when learners are presented with the patent history by the facilitator.
  - Patient history: John Doe is a healthy 30-year old male without any significant past medical history. He has no medications and NKDA. He weight 70kg and is 6' tall. He presents with a spontaneous pneumothorax
- Prior to entering the OR and beginning the case, learners are encouraged to discuss potential complications of the procedure and the plan for induction, need for invasive line placement, maintenance, and emergence.
- Learners are then assessed on their ability to address the items deemed critical to quality care. They are as follows:
  - 1. Hypoxia-90% SpO2 – learners are to recognize ventilation perfusion mismatch during one lung ventilation and treat with CPAP and PEEP to improve V/Q matching
  - 2. Hypoxia-85% SpO2 – learner recognizes need for 2 lung ventilation to reverse hypoxia
- Learners may provide inappropriate management or pursue the wrong course of treatment. If this happens, the simulation may be modified at the discretion of the instructor (e.g., if an antihypertensive is given to a hypotensive patient, the patient may require chest compressions and advanced cardiovascular life support).
- When possible, the time of each event should be noted on the checklist, as this can be useful for discussing the sequence of events and looking at video feedback in the debriefing.
- Following the simulation, learners can utilize debriefing materials in order to self-reflect or discuss the simulation with a facilitator

DATA

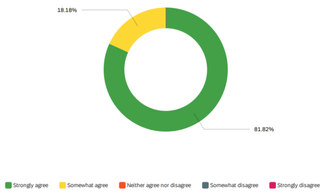
Q5 - The one-lung ventilation simulation was appropriate for my level of education and training



Q8 - Using a double lumen endotracheal tube with a high fidelity simulator helped me to understand one lung ventilation better.



Q10 - Holding and working with double lumen endotracheal tubes and bronchial blockers helped me to understand how to use these items in clinical anesthesia practice.



DISCUSSION

- Simulation is an optimal way to practice the more rare and life-threatening clinical events in medicine. Hypoxia is a relatively common condition to treat in the OR, particularly during OLV.
- Based off survey responses this simulation is an effective and educational way to discuss the most recent hypoxia definition and review evidence-based guidelines for treatment.
- Numerous anesthesiology residents and faculty have experienced this simulation and have worked to improve it

SURVEY

https://iu.co1.qualtrics.com/jfe/form/SV_73CtIlSHKG8afjL

APPENDICES

Available upon request

REFERENCES

Available upon request